

Date: Friday, 2/23/2007 9:54:10 AM
User: Jean-Luc Menard

Process Sheet

Customer : CU-DAR001 Dart Helicopters Services Drawing Name : X-TUBE 412
Job Number : 30935
Estimate Number : 12727
P.O. Number : *N/A*
This Issue : 2/23/2007 S.O. No. : *N/A*
Prsht Rev. : NC
First Issue : *N/A* Type : LANDING GEAR
Previous Run : 30739
Written By : *[Signature]*
Checked & Approved By : *[Signature]*
Comment : Est Rev:A New Issue 07-02-14 JLM

Part Number : D412664245
Drawing Number : D412-664-245 U/R
Project Number : N/A
Drawing Revision : U/R
Material : *N/A*
Due Date : 3/2/2007 Qty: 2 Um: Each

Additional Product

Job Number: 

Seq. #: Machine Or Operation: Description :

1.0 D6009129 Crosstube Material



Comment: Qty.: 1.0000 Each(s)/Unit Total : 2.0000 Each(s)

Pick:

Qty Part number Description Batch

1 D6009-129 Crosstube *26548*

Check OD = 3.500"; ID = 2.250"

BC 07.07.25

2

2.0 MORI SEIKI MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

Turn as per Dwg D412-664-245

BC 07.07.25

2

3.0 QC2 INSPECT PARTS AS THEY COME OFF MACHINE



Comment: INSPECT PARTS AS THEY COME OFF MACHINE

BC 07.07.25

2

4.0 QC8 SECOND CHECK



Comment: SECOND CHECK

En 07/02/26 (2)

5.0 LANDING GEAR 1 LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Polish entire outside surface of crosstube

DP

7-2-26

(2)

Date: Friday, 2/23/2007 9:54:10 AM
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Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: X-TUBE 412

Job Number: 30935

Part Number: D412664245

Job Number:



Seq. #:	Machine Or Operation:	Description :
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6.0	QC5	INSPECT WORK TO CURRENT STEP
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Comment: INSPECT WORK TO CURRENT STEP

BE 07-02-26

7.0	HAND FINISHING1	HAND FINISHING RESOURCE #1
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Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

N/A

P 07.03.05

8.0	QC3/5	INSPECT WORK/WING WALK
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Comment: Inspect work & Chemical conversion Coat

N/A

P 07.03.05

9.0	BENDING	BENDING MACHINE
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Comment: BENDING MACHINE

Bend tube as per Dwg D412-664-243 using CNC bender program 412-af and Folio FT010

DP 7-2-28 (1)

10.0	QC6	DIMENSIONAL CHECK
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Comment: DIMENSIONAL CHECK

P 07.03.05

11.0	LANDING GEAR 1	LANDING GEAR RESOURCE 1
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Comment: LANDING GEAR RESOURCE 1

- Cut Tube as per DWG D412-664-245

1-Drill pilot holes in tube as per Dwg D412-664-245

2-Ream hole to finish size in tube as per Dwg D412-664-245

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-245

DP
EL
7-3-5

12.0	HAND FINISHING1	HAND FINISHING RESOURCE #1
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Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

DP 7-3-5

Date: Friday, 2/23/2007 9:54:10 AM
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Part Number: D412664245

Job Number:



Seq. #: Machine Or Operation: Description :

13.0 QC3 INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

BT 07-03-05

14.0 QC5 INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

CP 07.03.05

15.0 D2732 Rubber Extrusion



Comment: Qty.: 0.4830 f(s)/Unit Total : 0.9660 f(s)
Rubber Extrusion
2 X 5.8" pcs
Batch:

N/A CP 07.03.05

16.0 D28961 Support



Comment: Qty.: 1.0000 Each(s)/Unit Total : 2.0000 Each(s)
Pick:
Qty Part number Description Batch
1 D2896-1 Support

B27266

AT 07 03 05

17.0 D2856600 Abrasion Strip



Comment: Qty.: 0.9450 f(s)/Unit Total : 1.8900 f(s)
Abrasion Strip
Qty (1) 2X D2856-600-1009
Batch: B26650

CP 07.03.05

DP 7-3-5

18.0 MS2192028 Clamp(per MIL-DTL-8783C)



Comment: Qty.: 4.0000 Each(s)/Unit Total : 8.0000 Each(s)
Pick:
Qty Part number Description Batch
4 MS21920-28 Clamp

102534

N/A CP 07.03.05

19.0 MS2192032 clamp(per MIL-DTL-8783C)



Comment: Qty.: 2.0000 Each(s)/Unit Total : 4.0000 Each(s)
clamp(per MIL-DTL-8783C)
batch: 102931

→ 46

44 Rivets PN# CR3212-4-6 x 44 pieces
M103688 BT

Chafing shield 2x
D3189-1 B27414 BT

Date: Friday, 2/23/2007 9:54:10 AM

User: Jean-Luc Menard

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: X-TUBE 412

Job Number: 30935

Part Number: D412664245

Job Number:



Seq. #:

Machine Or Operation:

Description :

20.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1
Assemble as per Dwg D412-664-245

Instal support with magnobond 6398 per dwg D412-664-245,
cure for 12hrs before packaging.

Time & date of application:

Batch:

9:30pm ST 07-03-15

N/A CP 07.03.05

21.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

CP 07.03.05

22.0

ENGINEERING 1

ENGINEERING RESOURCE #1



Comment: ENGINEERING Approval

Approval of project manager:

CP Menard 07.03.02

23.0

QC21

FINAL INSPECTION/W/O RELEASE



@1

Comment: FINAL INSPECTION/W/O RELEASE

CP 07/03/06

Job Completion



u 07-03-15



DART AEROSPACE LTD		Work Order:
Description: X-TUBE		Part Number: D412-664-245
Inspection Dwg: D412-664-245 Rev: B		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article
 ☒ Prototype

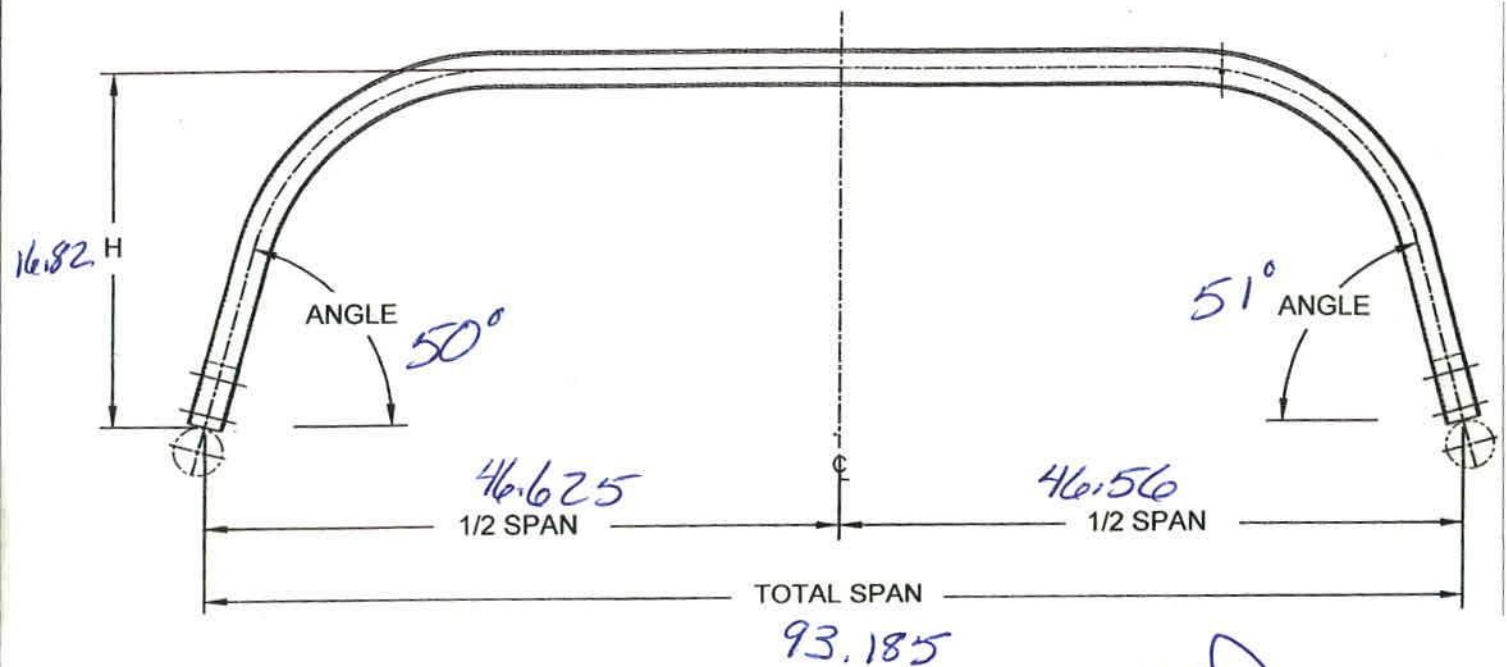
SIDE "A"

Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
123.588	+ .020	123.588	✓			
3.500	REF	3.493	✓			
3.256	+ .005 - .000	3.260	✓			
3.134	"	3.138	✓			
2.994	"	2.998	✓			
2.855	"	2.859	✓			
2.726	"	2.730	✓			
2.612	"	2.617	✓			
3.256	+ .005 - .000	3.260	✓			
3.134	"	3.138	✓			
2.994	"	2.998	✓			
2.855	"	2.859	✓			
2.726	"	2.730	✓			
2.612	"	2.616	✓			

Measured by: BG	Audited by: 	Prototype Approval: 
Date: 07.02.25	Date: 07.02.25	Date: 07.03.25

Rev	Date	Change	Revised by	Approved
A		New Issue	KJ/JLM	

Crosstube Bend Dimension Sheet



PART NUMBER: D412-664-245

BATCH NUMBER: 30935

DRAWING: D412-664-245 REVISION: _____

H: _____

$1/2 \text{ SPAN}$: _____

TOTAL SPAN : _____

ANGLE : _____

QC 15: _____

DATE: _____

QTY: _____

DP
7-3-5

Q 07.03.65

PRELIMINARY ISSUE
 07.03.01

DESIGN <i>QD</i>	DRAWN BY <i>QD</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED	APPROVED	DRAWING NO. D412-664-245	REV. B SHEET 1 OF 3
DATE 07.03.01	TITLE CROSSTUBE ASS'Y (412 LOW-N AFT)		SCALE NTS
A	06.12.01	NEW ISSUE	
B	07.03.01	CHG CUFF AREA, CHG RUBBER CUSHION	

PARTS LIST:

Qty	Part Number	Description
X	D412-664-245	CROSSTUBE ASSEMBLY (412 LOW-NARROW AFT)
1	D6009-129	CROSSTUBE
2	D2856-600-1009	ABRASION STRIP
1	D2896-1	SUPPORT
2	D3606-1	CUFF
2	D3607-058	RUBBER CUSHION
4	MS21920-28	CLAMP
2	MS21920-32	CLAMP
2	D3189-1	CHAFING SHIELD
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
A/R	SIKAFLEX-241/-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 2) MATERIAL: MANUFACTURED FROM D6009-129
FINISHED LENGTH = 123.59±0.020 (BEFORE BENDING/TRIMMING)
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE.
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 6) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2856-600-1009 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) APPLY A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR PACKAGING.
- 12) INSTALL MS21920-32 CLAMPS WITH D3607-058 RUBBER CUSHIONS TO SECURE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE SUPPORT.
- 13) TORQUE CLAMPS 80 TO 100 IN-LB.
- 14) INSTALL D3606-1 CUFF AFTER CHEMICAL CONVERSION COAT, BUT BEFORE PAINT, WITH A LAYER OF SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE.
- 15) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

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Date: Wednesday, 4/5/2006 3:24:08 PM
 User: Kim Johnston

Process Sheet

Customer : CU-DAR001 Dart Helicopters Services
 Job Number : 26548
 Estimate Number : 10030
 P.O. Number : N/A
 This Issue : 4/5/2006 S.O. No. : N/A
 Prsht Rev. : NC
 First Issue : N/A Type : LANDING GEAR
 Previous Run : 25942
 Drawing Name : CROSSTUBE EXTRUSION (412 AFT)
 Part Number : D6009129
 Drawing Number : D6009 REV A
 Project Number : N/A
 Drawing Revision : A
 Material : N/A
 Due Date : 7/20/2006 Qty: 25 Um: Each
 Written By : SEE COMMENT BELOW
 Checked & Approved By : 06.04.06
 Comment : Est Rev: A 01.08.17 New Issue SM

REFERENCE ONLY

Additional Product

Job Number:



Seq. #:

Machine Or Operation:

Description :

1.0

PG

PURCHASING



Comment: PURCHASING

Issue P/O:

933

u

06.04.10

a) Order as per Dwg D6009

b) Material: 3.500 x 0.625 wall 7075-T6/T6511 (WW-T-700/7 or QQ-A-225/9 or QQ-A-200/11) seamless aluminum tube

c) Minimum ultimate tensile strength = 77 ksi

d) Minimum tensile yield strength = 66 ksi

e) Tolerance are per ASTM B210 (see details on Dwg D6009)

f) Material certification required

2.0

D6009129P

Crosstube Material



Comment: Qty.: 1.0000 Each(s)/Unit Total: 25.0000 Each(s)

Crosstube Material

3.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Receive & Inspect For Transit Damage

Ensure material certification is attached

AR 06/08/11

27

4.0

QC6

DIMENSIONAL CHECK



Comment: DIMENSIONAL CHECK

Ensure Material certification comply to Dwg D

MS

06/08/10

DVAE

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: CROSSTUBE EXTRUSION (412 AFT)

Job Number: 26548

Part Number: D6009129

Job Number:



REFERENCE ONLY

Seq. #:

Machine Or Operation:

Description :

5.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



N/A

Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

6.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and Stock

Location: _____

MS

7.0

DC

DOCUMENT CONTROL



(27)

Comment: DOCUMENT CONTROL

Inspection Level 21

06/08/17

Job Completion



06-08-17



ALUnna

Aluminiumwerk Unna AG · Uelzener Weg 36 · D-59425 Unna

Dart Aerospace Ltd.
Main Finished Goods Location
1270 Aberdeen Street
CDN Hawkesbury, ONT, K6A1K7
Kanada

REFERENCE ONLY

Aluminiumwerk Unna AG
Uelzener Weg 36 · D-59425 Unna
Postfach 11 46 · D-59401
fon +49 (0) 23 03-206 -0
fax +49 (0) 23 03-206- 116
info@alu-unna.de
www.alu-unna.de

page: 1
date: 14.07.2006
customer: 40980

delivery note

26269

your PO dated: 3.04.2006
your PO No.: PO 00000933
confirmation No.: 18609

contact: Petra Eisenblätter
Tel.: +(303) 755 5672
Fax: +(303) 755 5936
representative: CLAUS J. BETTER

CARRIER: Senator International
Sour VAT No.:
AWU VAT No.: DE177869055
Country of origin: Germany

We supply acc. to our delivery terms and conditions:

item	quantity	unit	net kgs
002	27,000	PC	

AWU article: 17956 / Tariff no. 76082091

Customer article: D6009-129 3.500 X 0.625 X 129

product: TUBES / seamless extruded / EN AW-7075 / round

condition: T 6511 / AMS-QQ-A-200/11

outer diameter:	3,500 INCH Tol.	+0,016	-0,016
inner diameter:	2,250 INCH		
wall thickness:	0,625 INCH Tol.	+0,063	-0,063
fixed length	129,000 INCH Tol.	+0,188	

test report acc. to EN 10204/3.1 / RM 531 / Rp0,2: 455

straightness 0,01 INCH / 1 FEET / RMS outer 25

tol. on quantity +10 % -10 %

3.500" OD 0.625" Wall, 129" lengths

Part Number D6009-129 crosstube

Surface Finish max. RMS 25

Tolerances per ASTM B210

Straightness 0.010" deviation /12" length

Outside surface: max. defects up to 0.005" (longitudinally)

Min. ultimate tensile strength 77 ksi

Min. yield strength 66 ksi

Commerzbank AG, Unna
Konto-Nr. 102 56 00 · BLZ 443 400 37
S.W.I.F.T. - Code: COBADE FF 443
IBAN: DE 90 4434 0037 01025600 00
Sitz der Gesellschaft: Unna
Amtsgericht Hamm, HRB 3045
Vorstand: Volker Findelsen (Vors.), Thomas Wiese
Vorsitzende des Aufsichtsrats: Irene Wiese



delivery note

26269

page: 2
date: 14.07.2006
customer 40980

Tubes protected with corrosion protective oil

Tubes line marked

Packing list, Inspection certificate

Packing: seaworthy wooden cases

number of packages: 1

number of pieces: 27

Terms of payment: 30 days after date of delivery

terms of delivery: DDP (Delivered, Duty, Paid)

weight:	gross	1053,000	net	907,000
---------	-------	----------	-----	---------

Packstücke

customer address:

DART AEROSPACE LTD.

1270 Aberdeen Street

CDN K6A 1K7 HAWKESBURY

ON

Kanada

REFERENCE ONLY

Abnahmeprüfzeugnis 3.1 - EN 10204:2004

Inspection Certificate 3.1 - EN 10204:2004 / Certificat de Reception 3.1- EN 10204:2004

Kunde: Dart Aerospace Ltd.
Client:
1270 Aberdeen Street
K6A1K7 Hawkesbury, ON Canada

Zeugnisnummer: 555/06
Cert No.: / No. du certificat:
Bestellnummer: PO 00000933
Order No. / No. de commande
Auftrag: 18609/2
Our Reference/Notre Reference:

REFERENCE ONLY

Produkt: Rohre nahtlos gepresst
Product / Produit: Tubes seamless extruded
Spezifikation: -; AMS - QQ - A - 200/11E; -; -
Specification:

Werkstoff: 7075
Alloy/Alliage:

Zustand: T 6511
Temper/État

Abmessung: 3,500 INCH x 2,250 INCH x 0,625 INCH x 129,000 INCH
Size / Dimension: D6009-129 3.500 X 0.625 X 129

Kennzeichnung: AlUnna - Cert No. 555/06 - 7075 T 6511 - Cast No. 01604347 - QQA 200/11E - 3.500" OD X 0.625" Wall - Heat No. 475/06 - Lot 18609/2-1 PO. 00000933
Marking/Marquage:

Lieferung: pcs. lbs
Delivered Material / Matériel délivré: 27 1999 **Country of Manufacture: Germany**

1. Chemische Analyse Chemical Analysis / analyse chimique

	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Pb	Zr	Bi	Sn	Ni
Charge/ min.			1,2		2,1	0,18	5,1						
Cast No. max.	0,40	0,50	2,0	0,30	2,9	0,28	6,1	0,20					
01604347	0,09	0,21	1,36	0,04	2,34	0,18	5,68	0,03	0,00	0,02			0,0000

Hydrogen content: <0,15 ccm/100 g Al

Elements without indication < 0,01 %

2. Mechanische Eigenschaften Mechanical Properties / Valeurs Mécaniques

Anforderungen Requirements	tensile (Rm) ksi	yield (Rp0,2) ksi	elongation 2" %	elongation A %	Hardness HB	Heat No.
min.	77,0	66,0				
max.						
1	79,025	71,775	12,5		151	475/06 - 27 pcs.
2	79,460	72,210	11,0		161	

Ergebnis der Prüfungen: Es wird bestätigt, daß die Lieferung geprüft wurde und den Vereinbarungen bei der Bestellannahme entspricht

Test results: We confirm that the delivery has been tested and applies to the agreements made on receipt of the order
Resultats: Nous confirmons que la livraison a été contrôlée et correspond avec les conventions faites à la réception de la commande

KroosD

07.07.2006



Certified acc. to DIN EN ISO 9001:2000, valid until 2009-03-27
Certificate No.: 001959 QM



AlUnna

Aluminiumwerk Unna AG, Uelzener Weg 36, 59425 Unna, Germany

Abnahmebeauftragter

Customer PO	PO. 00000933
ALUnna ref. no.	18609/2
Date:	07.11.06

Dart Aerospace PO. 00000933 D 6009-129
Made in Germany
Dest. Hawkesbury Ont. Canada

free from live plant pests

63 m³

REFERENCE ONLY

67.03.05

Job: 30935

P/N D412-664-245

Deviations.

- MISSING 60.386 HUES (CITY) FOR INSTALL ON BELL SADDLES. NOT REQ'D FOR DEFLECTION OR STRUCTURAL TEST
- MISSING D3189-1 CHIPPING SHIELD & ASSOCIATED HARDWARE. NOT REQ'D FOR DEFLECTION OR STRUCTURAL TEST.
- NO PRIME OR PAINT, NOT REQ'D
- D2816-1 SUPPORT INSTALLED W/O RUBBER CUSHIONS. USED ABRASION STRIP INSTEAD (D2856). THIS DOES NOT AFFECT DEFLECTION OR STRUCTURAL TEST.
- D3606-1 CUFF MADE FROM 6061 INSTEAD OF 7075. NO SIKAFLEX BETWEEN CUFF & TUBE. DOES NOT AFFECT DEFLECTION OR STRUCTURAL TEST.

Q 07.03.05